

The Oracle logo is displayed in a large, bold, red, sans-serif font, centered within a white rectangular frame.The slide features a horizontal banner at the top. The left portion of the banner shows a photograph of a modern, multi-story building with a curved facade and blue-tinted windows, situated next to a body of water. The right portion of the banner is a solid red rectangle. Below the banner, the Oracle logo is centered in red. Underneath the logo, the title "Selftuning Database – Ein Traum oder Wirklichkeit?" is written in a bold, black, sans-serif font. At the bottom, the author's name "Ralf Durben" and affiliation "Oracle Deutschland GmbH" are listed in a smaller, black, sans-serif font.

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**Selftuning Database – Ein Traum oder Wirklichkeit?**

Ralf Durben  
Oracle Deutschland GmbH

## Die Arbeitswelt des DBA

### Gestern, heute und morgen

- Früher
  - Ein DBA für wenige Datenbanken
- DBA muß immer mehr Datenbanken betreuen
  - Weniger Verständnis für die Anwendungen
  - Wer soll SQL Tuning betreiben?
  - Toolunterstützung

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## Klassische Arbeitsweise von Tools

- 1. Generation
  - Grafische Umsetzung des SQL Handbuchs
  - Dialoge im Tool ersetzen Kenntnis der SQL Syntax
- 2. Generation
  - Wizards fassen komplexere Aufgaben in einen Workflow zusammen
- 3. Generation
  - Intelligente Algorithmen analysieren den Ist-Zustand und prüfen Verbesserungsmaßnahmen
  - Intelligente Algorithmen helfen dem Nutzer des Tools bei Entscheidungen

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## Probleme der klassischen Tools

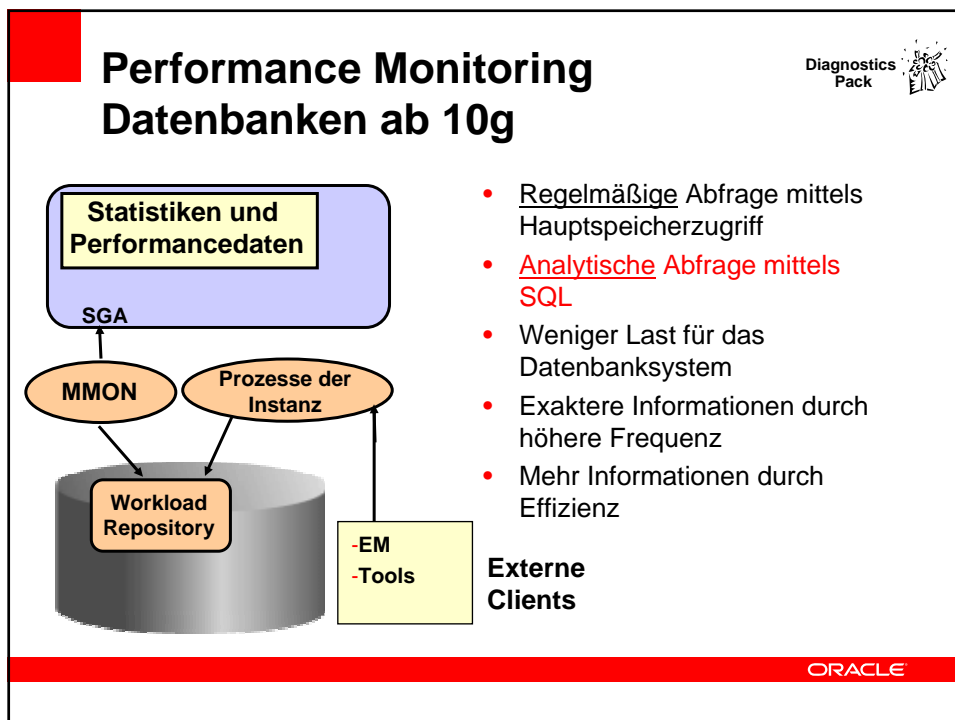
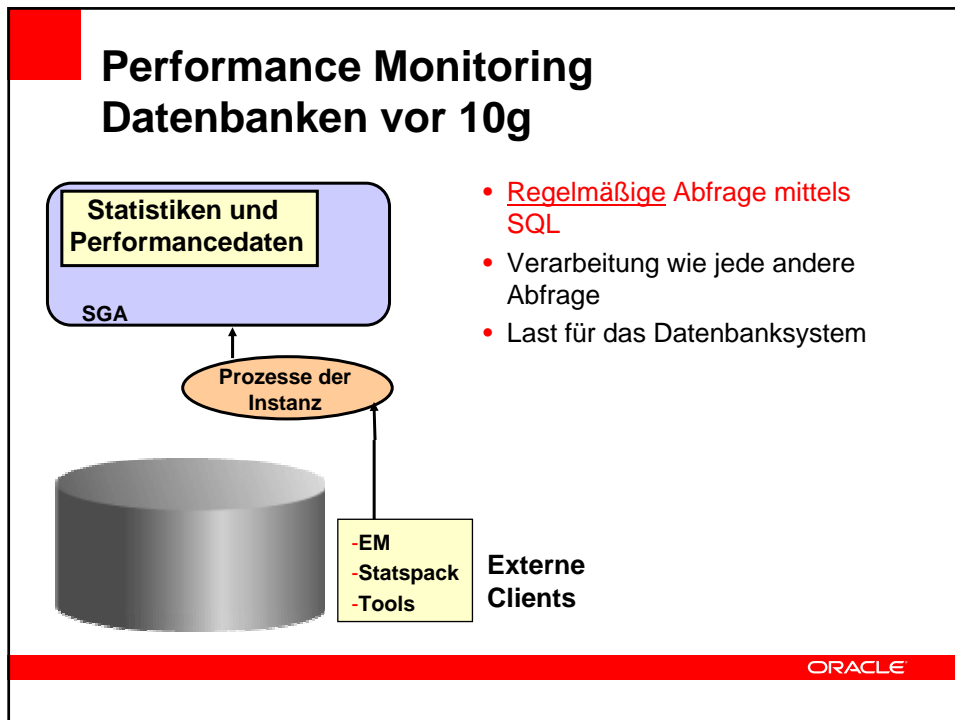
- Kernfrage:  
Welche Datenbankversionen werden von einem Tool optimal unterstützt?
- Antwort der Toolhersteller:  
Alle Versionen, die generell vom Tool unterstützt werden
- ABER:  
Kann das so richtig sein?  
Jede Datenbankversion hat ihre Eigenheiten!  
Berücksichtigt das externe Tool alle Eigenheiten jeder Version?  
-> **NEIN**

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## Die Lösung

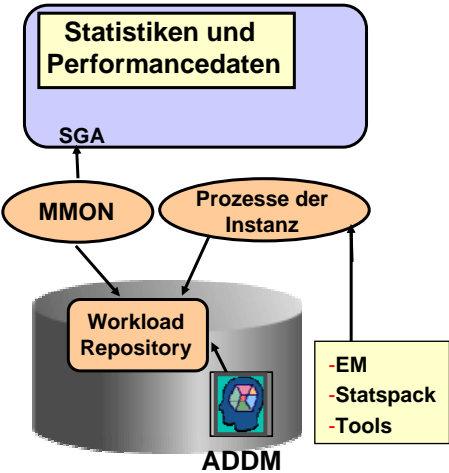
- Intelligente Algorithmen gehören in die Datenbank
  - Nur eine Version muss berücksichtigt werden
    - Tool ist damit immer optimal für gegebene Version
  - Nähe zum Kernel
    - Tool ist schneller und effizienter
  - Neue Diagnose- und Tuningmethoden werden möglich
    - SQL-Tuning ohne Ändern des Codes
    - Das kann kein externes Tool!

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## Performance Monitoring Datenbanken ab 10g






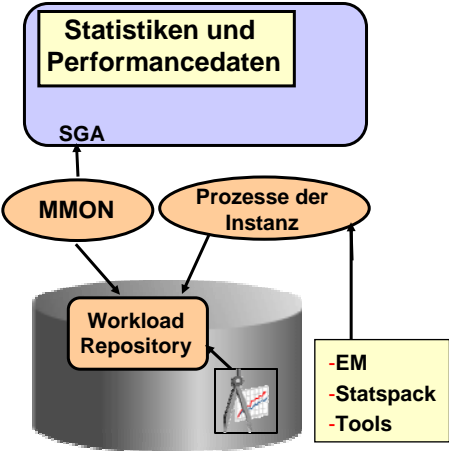
- Automatischer Datenbank Diagnostik **Monitor**
- Performancedaten werden automatisch analysiert
- ADDM gibt Ratschläge
- Leicht verständliche Empfehlungen für den DBA

**Externe Clients**

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## Tuning Datenbanken ab 10g

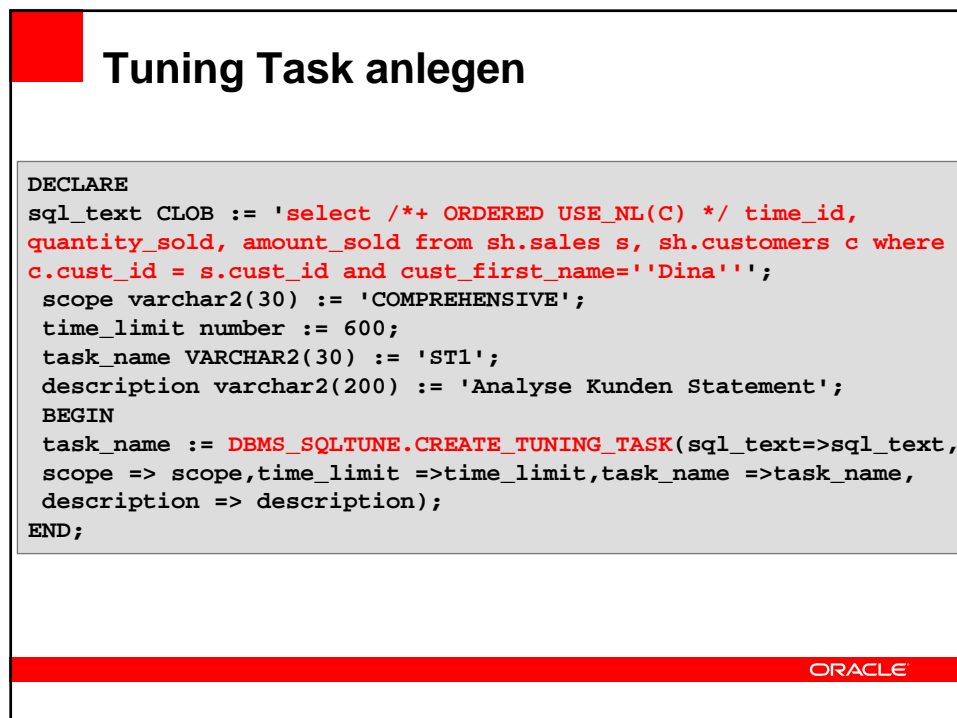
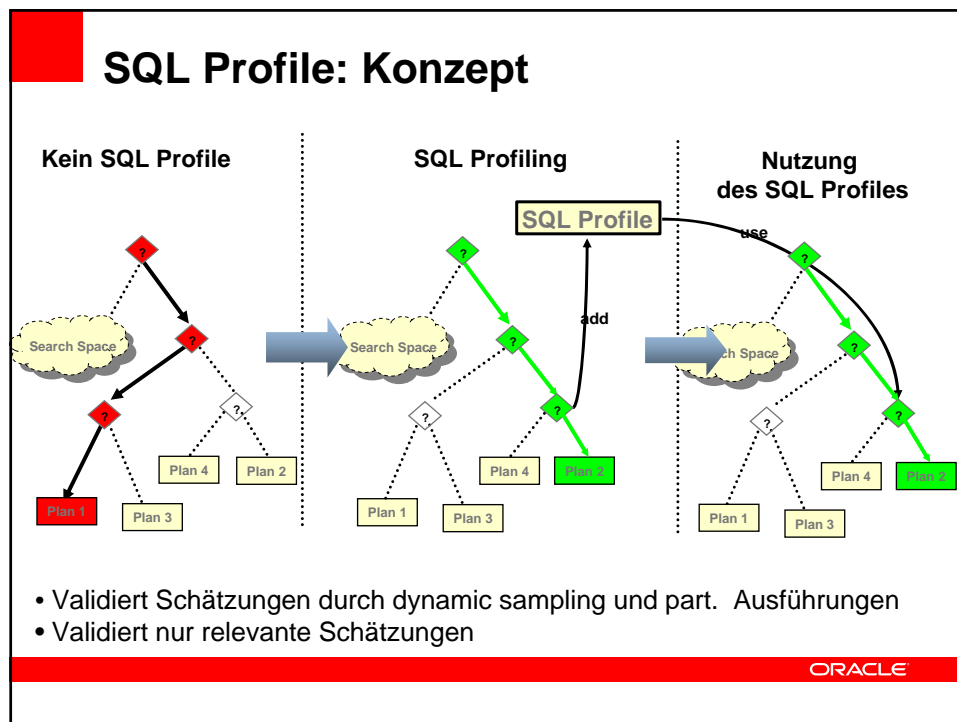




- Tuningalgorithmen in der Datenbank
- Optimal für gegebene Datenbankversion
- Tuning ohne Veränderung der Anwendung
- Tuning ohne Kenntnis der Anwendung

**Externe Clients**

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## Tuning Task und Bericht

```
SQL> exec dbms_sqltune.execute_tuning_task('ST1');
PL/SQL procedure successfully completed.

SQL> select dbms_sqltune.report_tuning_task('ST1') from dual;

DBMS_SQLTUNE.REPORT_TUNING_TAS
-----
GENERAL INFORMATION SECTION
-----
Tuning Task Name           : ST1
Tuning Task Owner         : SH
Scope                     : COMPREHENSIVE
Time Limit(seconds)      : 600
Completion Status        : COMPLETED
Started at                : 10/23/2006 16:00:35
Completed at             : 10/23/2006 16:00:53
Number of Statistic Findings : 2
Number of SQL Profile Findings : 1
...

```

## Ausführungsplan im Original

```
1- Original With Adjusted Cost
-----
Plan hash value: 2209165993
-----

| Id | Operation                               | Name           | Rows  | ... | Cost
|----|-----|-----|-----|-----|-----|
| 0  | SELECT STATEMENT                       |                | 822   | ... | 920K
| 1  |   NESTED LOOPS                         |                | 822   | ... | 920K
| 2  |     PARTITION RANGE ALL                 |                | 918K  | ... | 400
| 3  |       TABLE ACCESS FULL                | SALES          | 918K  | ... | 400
| 4  |         TABLE ACCESS BY INDEX ROWID    | CUSTOMERS      | 1     | ... | 1
| 5  |           INDEX UNIQUE SCAN              | CUSTOMERS_PK   | 1     | ... | 0
-----

```

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## Ausführungsplan mit SQL Profile

2- Using SQL Profile

-----  
Plan hash value: 2430218750  
-----

Id	Operation	Name	Rows	Bytes	Cost	
Time	Pstart	Pstop				
0	SELECT STATEMENT		822	27126	738	...
1	HASH JOIN		822	27126	738	...
2	TABLE ACCESS FULL	CUSTOMERS	43	516	329	...
3	PARTITION RANGE ALL		918K	18M	400	...
4	TABLE ACCESS FULL	SALES	918K	18M	400	...

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## Profil akzeptieren

```
SQL> variable p_name varchar2(50)
SQL> execute
:p_name:=dbms_sqltune.accept_sql_profile(task_name=>'ST1',
name='ST1', category=>'TEST1', FORCE_MATCH=>TRUE);

PL/SQL procedure successfully completed.
```

- CATEGORY analog zu SQTUNE\_CATEGORY Parameter
- FORCE\_MATCH analog zu CURSOR\_SHARING
- Privileg: CREATE ANY SQL PROFILE

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## Das Ergebnis

Elapsed: **00:00:00.68** ---- vorher 00:00:11.79

```

-----
-
| Id | Operation          | Name          | Rows  | Bytes | Cost |
|----|-----|-----|-----|-----|-----|
| Time | Pstart | Pstop |
-----
--
| 0 | SELECT STATEMENT |               | 893   | 27126 | 955   | ...
| 1 | HASH JOIN        |               | 893   | 27126 | 955   | ...
| 2 | TABLE ACCESS FULL | CUSTOMERS    | 23    | 230   | 408   | ...
| 3 | PARTITION RANGE ALL |              | 919K  | 14M   | 529   | ...
| 4 | TABLE ACCESS FULL | SALES        | 919K  | 14M   | 529   | ...
-----

```

--| Predicate Information (identified by operation id):

```

-----
1 - access("C"."CUST_ID"="S"."CUST_ID")
2 - filter("CUST_FIRST_NAME"='Dina')

```

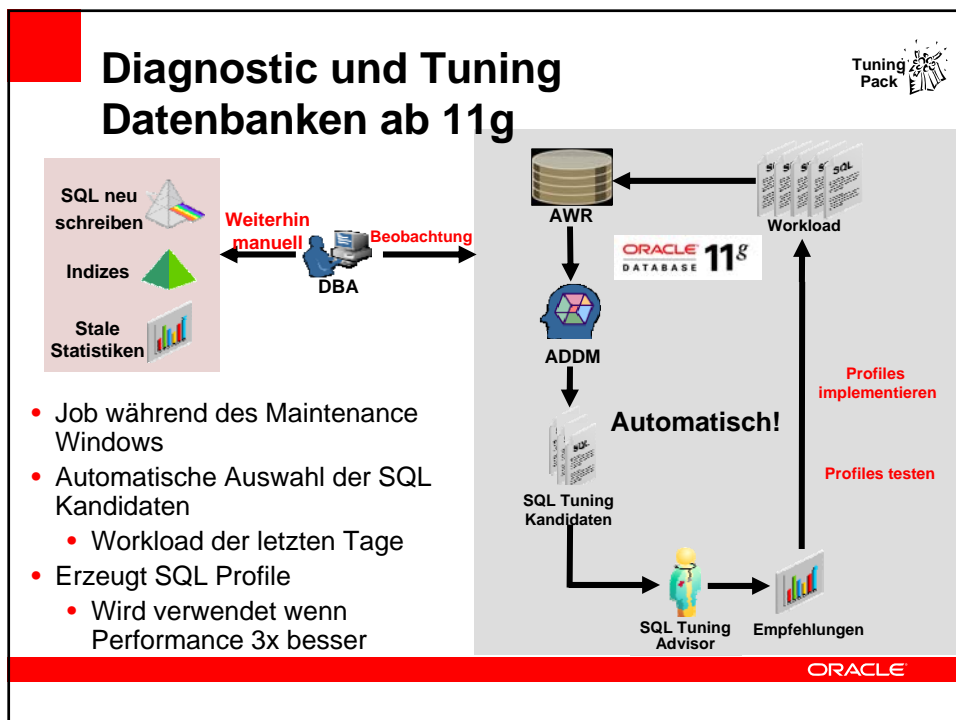
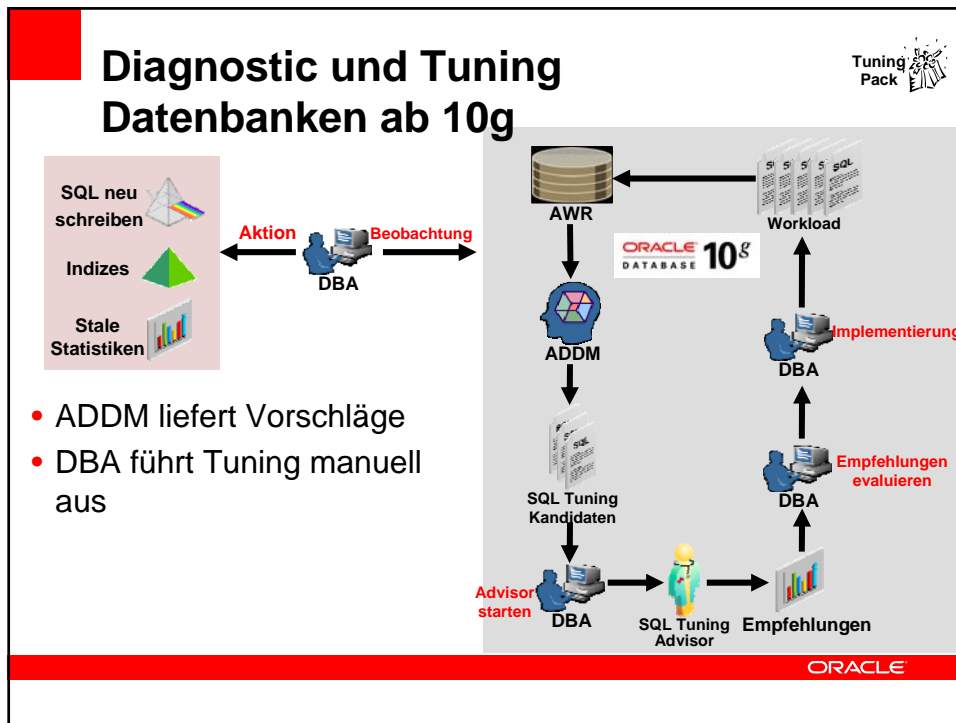
Note

-----  
- **SQL profile "ST1\_P" used for this statement**

## Strategiewechsel

- Implementierung des Monitorings und Tunings wandert vom externen Tool in die Datenbank
  - Optimale Anpassung an Datenbankversion
  - Optimale Performance da direkt im DB-Kernel
- Funktionalität traditionell in Tools
  - Wettbewerb
  - Kostenpflichtig (Datenbank Diagnostics Pack, bzw. Datenbank Tuning Pack)

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# Tuningempfehlungen

**Task Status**  
 Automatic SQL Tuning (SYS\_AUTO\_SQL\_TUNING\_TASK) is currently **Enabled** [Configure](#)  
 Automatic Implementation of SQL Profiles is currently **Disabled**  
 Highly Recommended SQL Profiles: 3 [Implement All](#)

**Task Activity Summary**  
 The activity summary graph shows the benefits of the task activities on the systems high-load SQL. Only profiles that significantly improve SQL performance were implemented.  
 Time Period: [All](#) [Go](#) [View Report](#)  
 Begin Date: **Aug 20, 2007 10:00:10 PM (UTC+02:00)** End Date: **Aug 25, 2007 4:19:34 AM (UTC+02:00)**

**Overall Task Statistics**  
 Executions: 4 Candidates SQL: 78 Distinct SQL Examined: 23

**SQL Examined Status**

**Breakdown by Finding Type**

**Profile Effect Statistics**  
 Tuned SQL DB Time Benefit (seconds per week)  
 Implemented (sec) 0 Potential (sec) 17244

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# Kandidaten für SQL-Tuning

**ORACLE Enterprise Manager 11g** Database Control [Site](#) [Preference](#) [Help](#) [Logout](#)

Database Instance: orcl > Automated Maintenance Tasks > Automatic SQL Tuning > Automatic SQL Tuning Result Details Logged in As SYS

Begin Date: **Aug 20, 2007 10:00:10 PM (UTC+02:00)** End Date: **Aug 25, 2007 4:19:34 AM (UTC+02:00)**

**Recommendations**  
 Only profiles that significantly improve SQL performance were implemented.  
[View Recommendations](#) [Implement All](#)

Select SQL Text	Parsing Schema	SQL ID	Statistics	SQL Profile	Index	Restructure SQL	Miscellaneous	Error	Date
<input type="radio"/> SELECT s.STATE_GUID, s.PAF_JOB_ST...	SYSMAN	4tr32k1r3h3h	✓	(100%) ✓			✓		8/20/07
<input checked="" type="radio"/> select /*+ use_nl(c) ordered */ s...	SH	4z7f8uagf8a	✓	(99.7%) ✓					8/22/07
<input type="radio"/> SELECT s.BI_TASK_ID, F.FINDING_ID	DESNMP	8b29b132af	✓	(96.1%) ✓					8/20/07
<input type="radio"/> select severity_code, message, b...	SYSMAN	8b29b132af	✓	(88.8%) ✓					8/24/07
<input type="radio"/> SELECT e.execution_name, e.description, ...	SYS	8b29b132af	✓	(86.2%) ✓					8/20/07
<input type="radio"/> SELECT NULL AS table_cat, t.owner...	SYSMAN	8b29b132af	✓	(82.5%) ✓					8/22/07
<input type="radio"/> SELECT e.execution_name, e.description, ...	SYS	8b29b132af	✓	(79.5%) ✓					8/20/07
<input type="radio"/> SELECT NLSUM(e.non_emvpt_violations_...	SYSMAN	8b29b132af	✓	(67.1%) ✓					8/23/07
<input type="radio"/> SELECT NLSUM(e.non_emvpt_violations_...	SYSMAN	8b29b132af	✓	(66.9%) ✓					8/20/07
<input type="radio"/> select s.sql_id, s.sql_text, s.plan_hash...	SYS	8b29b132af	✓	(51.4%) ✓					8/20/07
<input type="radio"/> select severity_code, message, b...	SYSMAN	8b29b132af	✓	(26.1%) ✓					8/24/07
<input type="radio"/> select severity_code, message, b...	SYSMAN	8b29b132af	✓	(13.3%) ✓					8/20/07
<input type="radio"/> SELECT INSTANTIABLE, supertype_owner, su...	SYSMAN	8b29b132af	✓	(<10%) ✓					8/20/07
<input type="radio"/> select composite_target_name, composite...	SYSMAN	8b29b132af	✓	(<10%) ✓					8/20/07
<input type="radio"/> SELECT INSTANTIABLE, supertype_owner, su...	SYSMAN	8b29b132af	✓	(<10%) ✓					8/22/07
<input type="radio"/> /* OracleDBEM */ SELECT PROPAGATION_NAM...	DESNMP	8b29b132af	✓	(<10%) ✓					8/22/07
<input type="radio"/> SELECT COUNT(*) FROM SYS.DBA_PROPAGATION	DESNMP	8b29b132af	✓	(<10%) ✓					8/20/07
<input type="radio"/> /* OracleDBEM */ SELECT PROPAGATION_NAM...	DESNMP	8b29b132af	✓	(<10%) ✓					8/20/07
<input type="radio"/> SELECT COUNT(*) FROM	DESNMP	8b29b132af	✓	(<10%) ✓					8/24/07

## Zusammenfassung

- Intelligente Algorithmen in der Datenbank statt in einem externen Tool
- SQL Tuning ohne Veränderung des SQL Kommandos mittels SQL Profile
- Automatisierung des SQL Tunings mit SQL Profiles

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